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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/805,106

03/19/2004

Mariano G. Fernandez

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ATTN: INT77

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EXAMINER

NGUYEN, PHILLIP H

ART UNIT

PAPER NUMBER

2191

MAIL DATE

DELIVERY MODE

10/31/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/805,106

Applicant(s)

FERNANDEZ ET AL.

Examiner

Phillip H. Nguyen

Art Unit

2191

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed 8/15/2007.
2. Claims 1-35 remain pending and have been considered below.

Response to Amendment

3. Per Applicants' request, claims 1-3, 6-8, 10-11, 13-16, 18-27, 29-31 and 33-34 have been amended.
4. The rejection of claims 13-35 under 35 USC § 101 is withdrawn in view of Applicants' amendment to claim 13 to clarify the system.

Response to Arguments

5. Applicant's arguments with respect to claims 1-35 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Worrell (United States Patent No.: 5,774,709).

As per claims 1, 13 and 24:

Worrell discloses:

- accessing a program comprising a plurality of instructions including at least one no operation (NOP) instruction (see at least **FIGS. 1A-1B**).

Worrell does not explicitly disclose:

- determining one instruction in the program preceding a determined NOP instruction whose movement forward to replace the determined NOP instruction will not result in data not being available when needed; and
- replacing the determined NOP instruction with the determined instruction preceding the determined NOP instruction.

However, it would have been obvious to one having an ordinary skill in the art at the time the invention was made to recognize that both Worrell's invention and the applicant's invention provide the optimizing instruction sequences by delete NOP instruction. Either replacing the determined NOP instruction with the determined instruction preceding the determined NOP instruction or replacing the determined NOP instruction with the target instruction following the determined NOP instruction, both provide the same result. Worrell discloses five branch optimization examples (see col. 4 – col. 5) and at least one of the example shows replacing NOP instruction with a non-NOP instruction.

Therefore, one would have been motivated to modify Worrell's approach to allow replacing NOP instruction with a non-NOP instruction preceding the NOP instruction

because both remove unwanted NOP instruction to provide an optimizing instruction sequences.

As per claims 2, 14 and 25:

Worrell further discloses:

- deleting one NOP instruction in the program that is not needed to provide a processing delay to ensure the data is available to at least one dependent instruction without moving a non-NOP instruction (see at least one example in col. 4 – col. 5).

As per claims 3, 15 and 26:

Worrell further discloses:

- see the rejection of claim 1.

As per claims 4, 16 and 27:

Worrell further discloses:

- performed an additional iteration of deleting at least one instruction and then replacing the at least one NOP instruction in response to replacing at least one NOP instruction (see at least one optimization example in col. 4 – col. 5).

As per claims 5, 17 and 28:

Worrell further discloses:

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- wherein the instructions in the program comprises assembly language instructions coded by a developer (see at least col. 4, lines 43-44 "**programming for MIPS microprocessors**").

As per claims 6, 18 and 29:

Worrell further discloses:

- determining whether the accessed NOP instruction is needed to delay processing of one dependent instruction following the accessed NOP instruction to ensure that data is available to the dependent instruction accessing the data (see at least col. 3, lines 20-25 "**The present invention also provides for the optimizing instruction sequences to avoid NOP instructions in branch delay slot. Thus optimized computer programs can be coded with a branch instruction immediately following another branch instruction yielding higher CPU performance**" – in other words, any determined unneeded NOP instruction is removed from the instruction sequence to provide an optimized instruction sequence); and
- deleting the accessed NOP instruction in response to determining that the NOP instruction is not needed to ensure that data is available to the dependent instruction accessing the data (see at least one example in col. 4 – col. 5).

As per claims 7, 19 and 30:

Worrell further discloses:

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- identifying instructions preceding the NOP instruction that have a delay in writing the results (**It is inherent – the purpose of having an NOP instruction is to delay for a number of cycles to ensure the data is available before executing the dependent instructions. Therefore instructions preceding the NOP instruction must have a delay in writing the result**); and
- identifying dependent instructions following the NOP instruction that are dependent on an availability of data from the identified instructions having the delay in writing the results (**It is inherent – the purpose of having an NOP instruction is to delay for a number of cycles to ensure the data is available before executing the dependent instructions. Therefore instructions following NOP instruction are dependent on the availability of data from the previous instructions**).

As per claims 8, 20 and 31:

Worrell further discloses:

- see the rejection of claim 1.

As per claims 9, 21 and 32:

Worrell further discloses:

- wherein the one previous instruction comprises a preceding instruction closet to the accessed NOP instruction in the program (see at least one optimization example in col. 4 – col. 5).

As per claims 10, 22 and 33:

Worrell further discloses:

- deleting at least one NOP instruction not needed to ensure that data accessed by the dependent instruction is available to the dependent instruction, wherein the operations of replacing accessed NOP instructions with previous non-NOP instructions are performed after deleting NOP instructions not needed to ensure that data accessed by the dependent instruction is available (see at least one optimization example in col. 4 – col. 5).

As per claims 11, 23 and 34:

Worrell further discloses:

- wherein the determined instruction is further not a branch target instruction (see at least one optimization example in col. 4 – col. 5).

As per claims 12, 24 and 35:

Worrell further discloses:

- wherein the program instructions are for execution by an engine in a multiprocessor engine (see at least col. 4, line 44 “**MIPS microprocessors**”).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip H. Nguyen whose telephone number is (571) 270-1070. The examiner can normally be reached on Monday - Thursday 10:00 AM - 3:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Y. Zhen can be reached on (571) 272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PN
10/28/2007



WEI ZHEN
SUPERVISORY PATENT EXAMINER